

Work Order ID 58872

Wednesday, May 19, 2010 9:01:18 AM

Page 1

Item ID: D205-634-041

Accept

Revision ID:

Item Name: Replacement Skidtube

Start Date: 5/19/2010 Start Qty: 1.00

Required Date: 6/9/2010 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan: *PL*Date: *10-5-19*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

N/A

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend I

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

M 10/5/25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

120

0.00



Skidtubes

Skidtubes

Memo

0.00

1- Deburr ends

2- C'sink holes as per dwg without cutting fluid

3- Prepare tube for welding, remove alodine as required.

4- Scribe batch number insied aft end of tube.

Q.M. 10-05-258

130

QC5- Inspect part completeness to step on W/O

0.00



QC

Quality Control

Memo

0.00

BE (K1) 10/05/26

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Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004

A/R□□□ Aluminum Rod

ml12860

BE 10/05/26

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R□□□ Aluminum Rod

ml12860

BE 10/05/26
10/05/27

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64", adjust stopper not to hit web. Debur

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Debur holes

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

MB
10-05-27

Pto →

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: ~~255~~ A205-634-04 PAR #: _____ Fault Category: Skid tube NCR: Yes No DQA: 10/05/27 Date: 10/05/27
Resolution: rework Disposition: rework QA: N/C Closed: 10/06/17 Date: 10/06/17

NCR: <u>58872</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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10/5/27	1	From AFT x-bolt space 16" is ovalized. R.C counter bore "kicked" at Bottom of hole causing it to be ovalized. (measure 0.455")	<u>ASum</u>	- Drill out the 16" from AFT x-bolt space + remove - Replace D2579 x1 B58433	<u>DP</u> 10-5-27 <u>BE</u> 10-5-28	<u>S</u> 10/6/17	<u>ASum</u>	<u>S</u> 10/5/27
			<u>ASum</u>	- re weld - re weld per D27004 A/2 M112860 - Buff welds + Re counter Bore to Per Dwg	<u>BE</u> 10-5-28 <u>M</u> 10/6/17	<u>S</u> 10/6/17	<u>ASum</u>	<u>S</u> 10/5/27

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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
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NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150



QC

Quality Control

QC10- Inspect visual per QSI004- ground welds

0.00

Memo

0.00

8/10/06/01

160



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

8/10/06/01

⑩

170



HandFinish

Hand Finishing

Pressure Wash per QSI005 4.3

0.00

Memo

0.00

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd
cap out of solution.

①

R 106-1

W/O:		WORK ORDER CHANGES					
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Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
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Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

180

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

0.00



Powdercoat

Memo

0.00

Powder Coating

START TIME:

8:30AM

OVEN TEMPERATURE:

320°F

FINISH TIME:

9:00AM

190

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

① BL 106-2

W/O:		WORK ORDER CHANGES					
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Reference:

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates
A/R ☐ ☐ ☐ Sikaflex-291 ☒ 113435 ☐ ☐
Sikaflex expire date: 12/1

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive
A/R ☐ ☐ ☐ Sikaflex-291 ☒ 113435 ☐ ☐
Sikaflex expire date: 12/1

5-Wing Walk as per Dwg D2580 and QSI 005 4.4
Batch: 114432

① BR 10-6-3.

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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



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210	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024								
220	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPPD205-634-041 Location: <u>PAP</u> PPP Rev: <u>58426</u>								
230	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

4010/06/1710/06/17mf 10-6-16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD
 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 5/19/2010

Required Date: 6/9/2010

Start Qty: 1.00

Required Qty: 1.00

D2580-1

Manufactured No

110

Each

6.0000

1



205 Skidtube bent detail



BS8748 ID M10/5/25

Location

Loc Qty

Loc Code

LG

6

57028

1

58090

1

58112

2

58384

1

58385

1

D2576-3

Manufactured No

140

Each

103.0000

1



Step (maching detail)



Location

Loc Qty

Loc Code

LG

103

46661

55

52215

48

D2579

Manufactured No

140

Each

53.0000

20



Crossbolt Spacer



Location

Loc Qty

Loc Code

LG

53

57052

5

57348

48

B 58433

*20

BE 10/05/26

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 102.0000 1



Cap



Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	100	
50513	1	
50770	28	
51539	17	
53791	54	

1 BK 10-6-3

AN3-5A Purchased No 200 Each 957.0000 2



Bolt



Location	Loc Qty	Loc Code
ST350	957	
105057	957	

2 BK 10-6-3

AN960JD10L Purchased No 200 Each 4,087.000 2



Washer



Location	Loc Qty	Loc Code
ST348	4087	
110985	4087	

2 BK 10-6-3

ALS7-1032-130 Purchased No 200 Each 17.0000 50



Insert



Location	Loc Qty	Loc Code
ST282	17	
113238	17	

50 BK 10-6-3

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Shop Packet Print

Page 2

AKSH-1032-130

114654

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

AN3C4A Purchased No 200 Each 1,549.000 50



BOLT

Location	Loc Qty	Loc Code
ST350	1549	
114103	501	
114108 ✓	300	
114416	12	
114523	736	

50 BL 10-6-3

AN960C10L Purchased No 200 Each 0.0000 50



washer

NAS1149C0332R 114341

50 BL 10-6-3

D3566-13 Manufactured No 200 Each 30.0000 1



Gasket

Location	Loc Qty	Loc Code
FP	30	
53461 ✓	30	

1 BL 10-6-3

D3566-5 Manufactured No 200 Each 18.0000 1



Gasket

Location	Loc Qty	Loc Code
FP015	18	
57682 ✓	18	

1 BL 10-6-3

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IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 35.0000 2



Gasket



Location Loc Qty Loc Code

FP015 35

57715 14

58182 ✓ 21

D3564-11 Manufactured No 200 Each 6.0000 1



Wearshoe



Location Loc Qty Loc Code

FP019 6

57957 6

D3564-13 Manufactured No 200 Each 24.0000 1



Wearshoe



Location Loc Qty Loc Code

FP17 24

57684 ✓ 10

57922 14

D3564-9 Manufactured No 200 Each 19.0000 1



Wearshoe



Location Loc Qty Loc Code

FP 1

55334 1

FP019 18

57685 4

57958 ✓ 14

2 BL 10-6-3

1 BL 10-6-3

1 BL 10-6-3

1 BL 10-6-3

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Start Qty: 1.00

Required Qty: 1.00

D3564-5 Manufactured No 200 Each 4.0000 1



Wearshoe



Location	Loc Qty	Loc Code
FG	1	
34806	1	
FP19 58709	3	
57525	1	
57729	2	

1 BR 10-6-3

D2594-3 Manufactured No 200 Each 359.0000 16



O-Ring, 205 Skidtube



Location	Loc Qty	Loc Code
FP	359	
55546	19	
58191 ✓	340	

16 BR 10-6-3

D2594-1 Manufactured No 200 Each 534.0000 16



Plug, 205 Skidtube



Location	Loc Qty	Loc Code
FP	334	
42807	112	
55002	80	
57826 ✓	142	
FP14	200	
58434	200	

16 BR 10-6-3.

W/O:		WORK ORDER CHANGES					
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DART

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07.06.28 *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL $\varnothing 0.297$ HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 58872
[Signature] 0-5-19

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Diagram illustrating the grinding locations for the propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576

Technical drawing of a circular component with a central hole and a rectangular slot. The drawing includes the following labels and dimensions:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)**: Points to two locations on the outer edge of the component.
- Ø0.208**: Dimension of the central hole.
- D2855 CAP**: Points to the cap of the central hole.
- AN3-5A BOLT (1)**: Points to the bolt securing the cap.
- AN960J10L WASHER (1)**: Points to the washer under the bolt.
- (2 PLACES)**: Points to two locations on the outer edge of the component.
- SEAL WITH SIKAFLEX-241/-291**: Points to the sealant applied around the cap.
- 0.40**: Dimension of the slot width.

D2579 SPACER

D2596 WEB (REF)

ALST-1032-130 (REF)
(TYP 50 PLACES)

AFTER PERFORM
1. CHA
2. INS
3. WEL
4. C'B

w/o 58872

37.50

DISTANCE TO AFT END OF D2598 WEB

3

7

1.750

1.750

Ø0.508 (TYP.) (40 PLACES)

REFER TO DETAIL A

8.750

17.375

26.000

34.188

57.313 (REF)

7 EQUAL SPACES

8.188 PITCH

38.0

91.500

190.0 (D2500-1)

WELD AS PER DETAIL B

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

0.5 1.5 1.5 D P P P P P P P

8

REFER TO DETAIL C

D3566-1 D3566-5 D3566-1 D3566-13

-D3564-11 -D3564-5 -D3564-9 -D3564-13

AN3C4A BOLT (1)
AN960C1DL WASHER (1)
(50 PLACES)

DESIGN	/	DRAWN BY	
--------	---	----------	--

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

DRAWING NO.	REV. D
D2580	SHEET 2 OF 3
TITLE	SCALE
205 SKIDTUBE ASSEMBLY	1:24

W/O:		WORK ORDER CHANGES					
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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07 Dec 28

Diagram illustrating the grinding locations on a propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- LOCATION RIDGE ON UNDERSIDE OF D2576
- GRIND FLUSH

Technical drawing of a circular component with various callouts for assembly instructions:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)
- SEAL WITH SIKAFLEX-241/-291
- AN3-SA BOLT (1)
- AN960J10L WASHER (1) (2 PLACES)
- D2855 CAP
- SEE NOTE ii)
- 0.40

Diagram illustrating the components of a propeller hub cross-section:

- D2579 SPACER
- D2596 WEB (REF)
- ALS7-1032-130 (REF) (TYP 50 PLACES)
- AFTER PERFORM:
 1. CHA
 2. INS
 3. WEI
 4. C'B

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE
WITH THE SPACER AT THIS LOCATION

[illegible]

Figure 1: Typical Drill Bit Detail. This technical drawing shows a side view of a drill bit with various dimensions. Key dimensions include: 5.985 (height at left), 1.4 (height at left), 5.338 (REF) (width), 51.340 (total length), 39.580 (length to hole), 5.915 (width), 3.630 (REF) (width), 0.508 (8 PLACES) (width), 20.0 (width), 0.640 (width), 11.5 (height at right), 1.0 (distance between hole and tangent point), 13.4 (distance), and 32.0 ± 1.0 (distance). A triangle with the number 4 is shown at the left end.

WELD AS PER DETAIL F

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

D3566-1

D3566-5

D3566-1

D3566-13

D3564-11

D3564-5

D3564-9

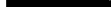
D3564-13

AN3C4A BOLT (1)

AN960C10L WASHER (1)

(50 PLACES)

DESIGN	DRAWN BY	
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DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY			SCALE 1:24

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

NO. 232

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 58508
Part number: D205 634 041
Description: 205 tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminium
Current: AC[☒] DC[]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier P. J. P. J. Date of Test Coupon 10.05.18
Welder Barclay Elliott Date of Test Coupon 10.05.18

The above named individual is qualified in accordance with AWS D17.1.2001 to weld